Figure 1

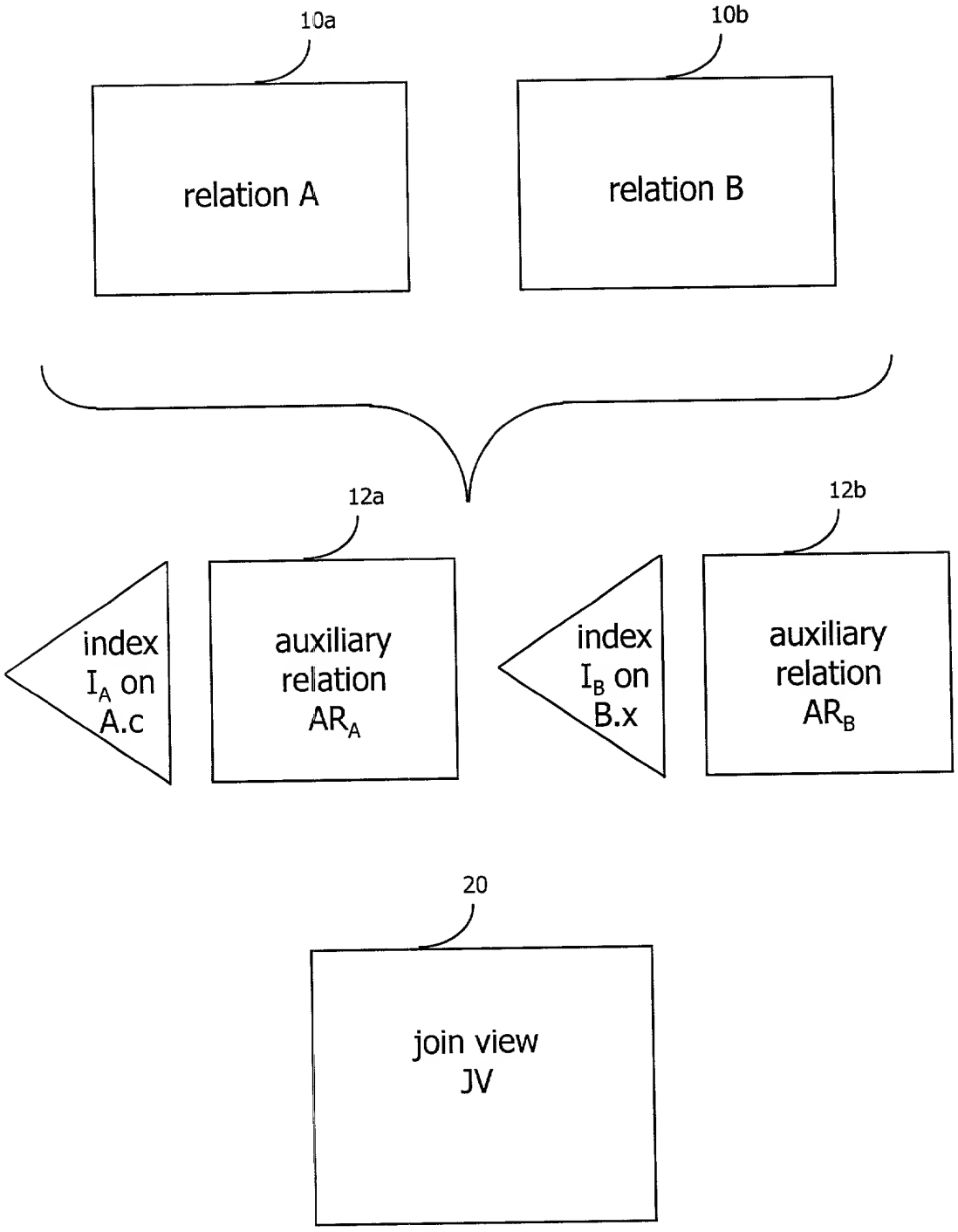

10a
10b
relation A
relation B
12a
12b
index
I_A on
A.c
auxiliary
relation
AR_A
index
I_B on
B.x
auxiliary
relation
AR_B
20
join view
JV

Figure 2

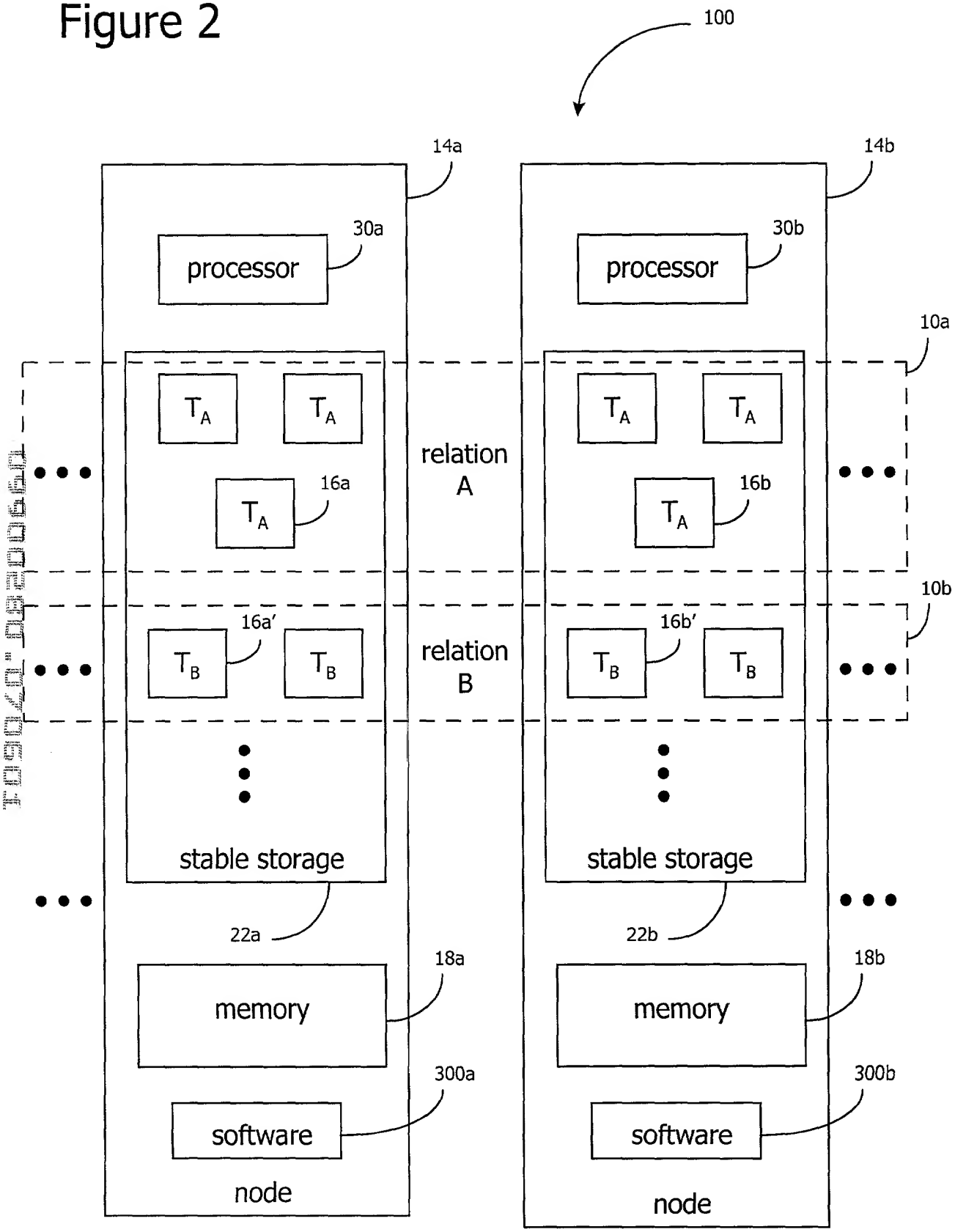
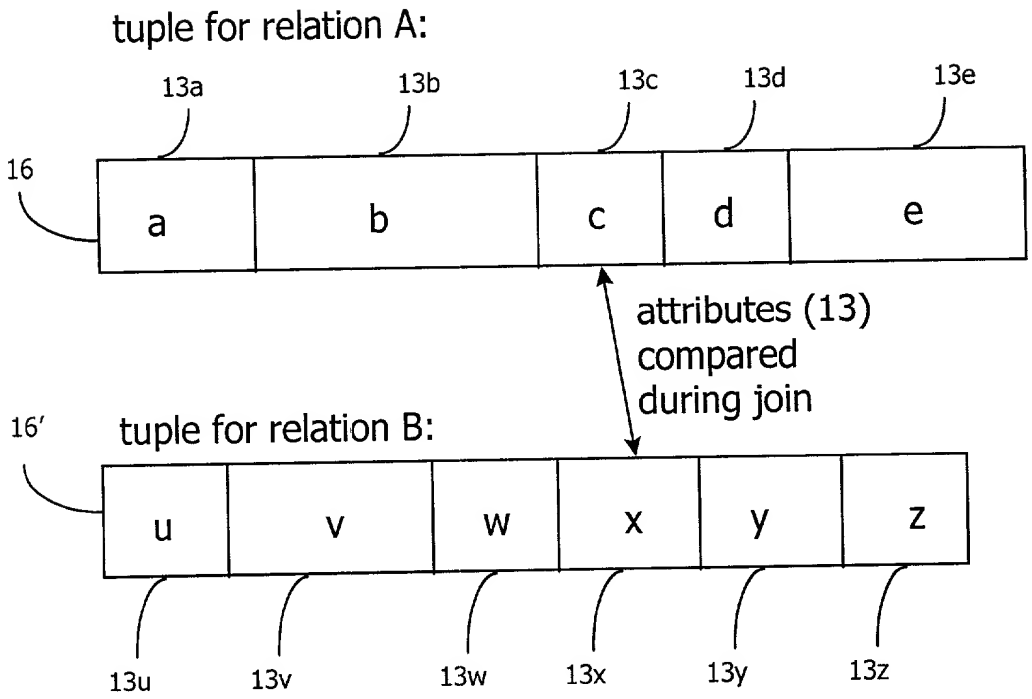

100
14a
14b
30a
processor
30b
processor
10a
T_A
T_A
T_A
16a
relation A
T_A
T_A
T_A
16b
10b
16a'
T_B
T_B
relation B
16b'
T_B
T_B
stable storage
stable storage
22a
22b
18a
memory
18b
memory
300a
software
300b
software
node
node

Figure 3



EP 0 907 276 A2 090205

Figure 4

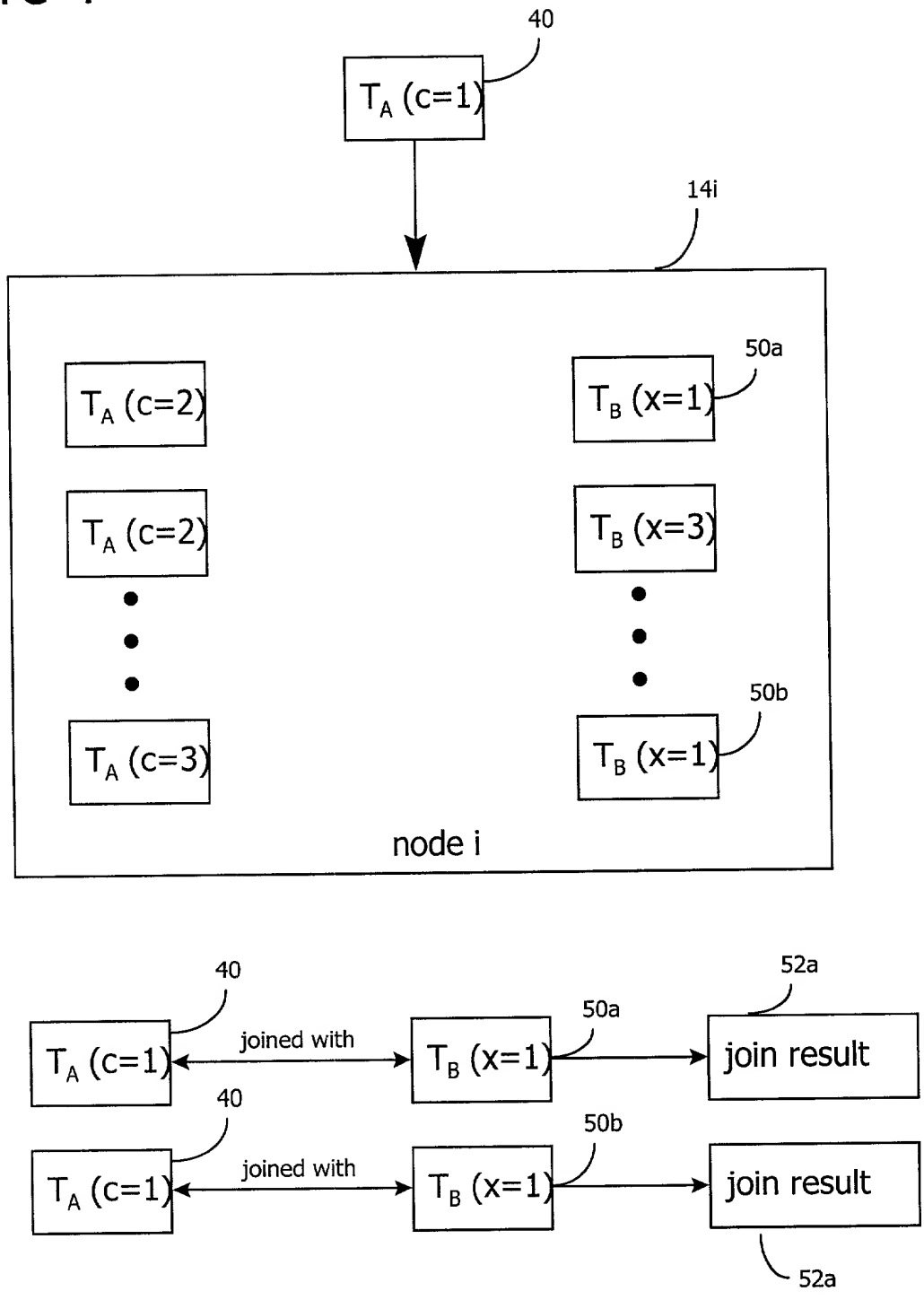
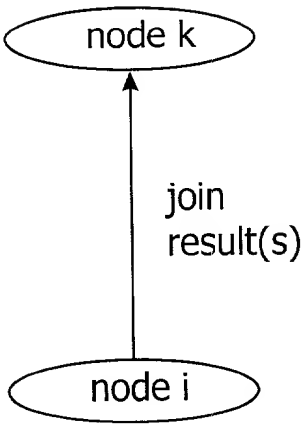

40
T_A (c=1)
14i
T_A (c=2)
T_A (c=2)
T_A (c=3)
50a
T_B (x=1)
T_B (x=3)
50b
T_B (x=1)
node i
40
T_A (c=1)
joined with
T_B (x=1)
50a
52a
join result
40
T_A (c=1)
joined with
T_B (x=1)
50b
join result
52a

Figure 5A



k) join result(s) inserted into join view JV

i2) T_A joined with T_B(s) to produce join result(s)

i1) T_A stored in relation A

Figure 5B

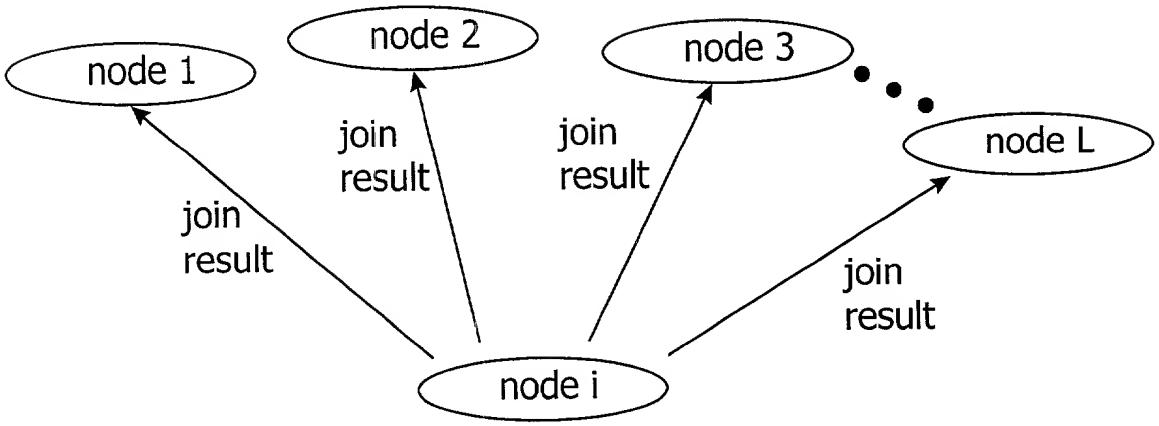


Figure 6A

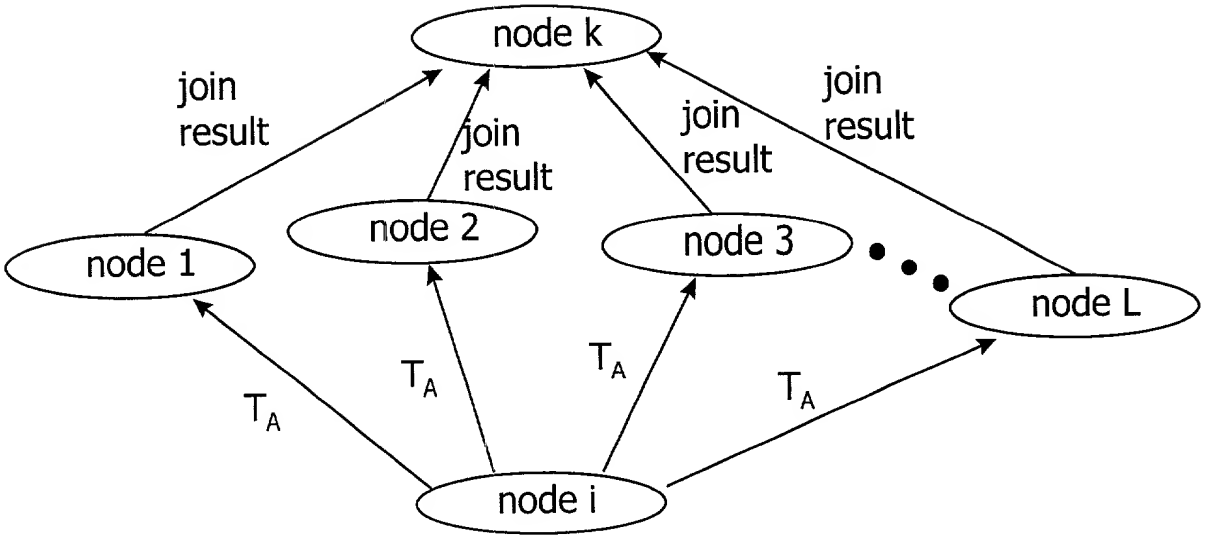


Figure 6B

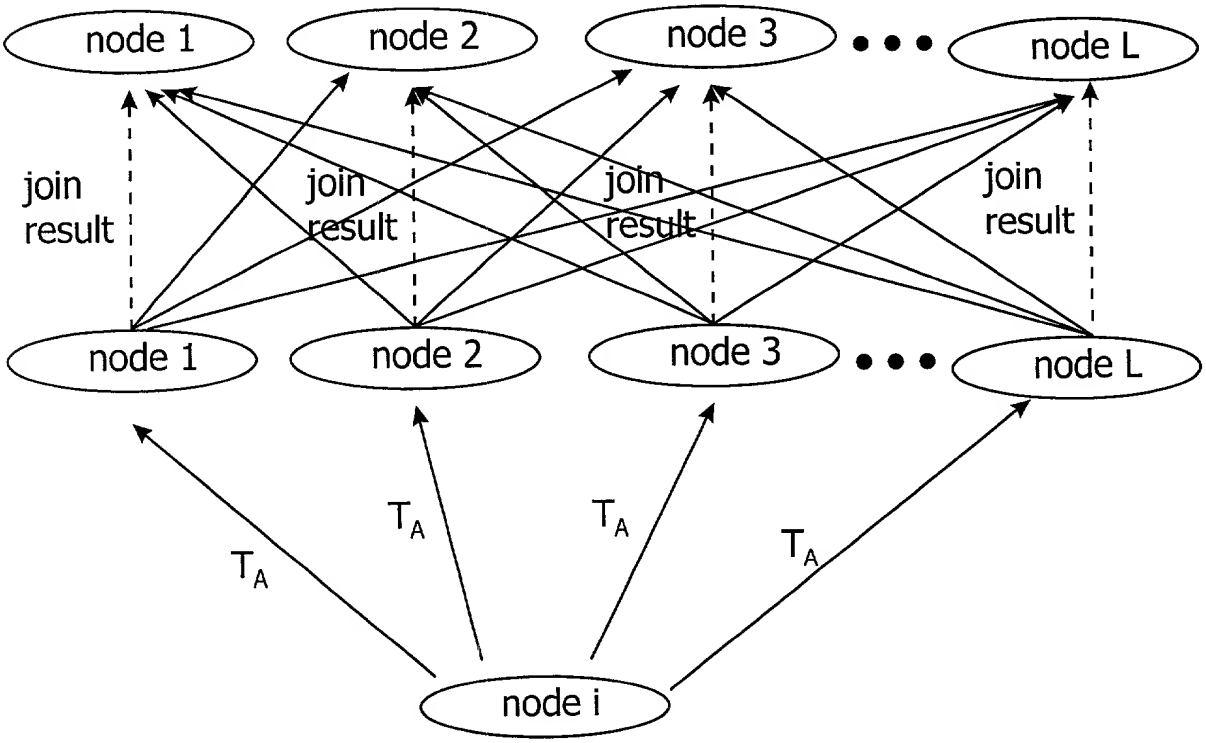
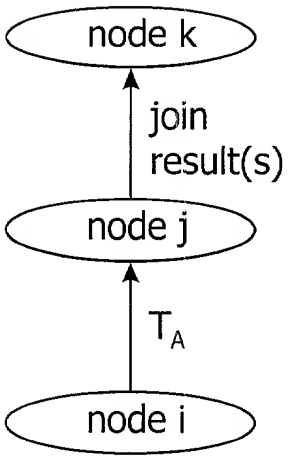


Figure 7A



k) join result(s) inserted into join view JV

j2) T_A joined with T_B(s) to produce join result(s)

j1) T_A stored in auxiliary relation AR_A

i) T_A stored in relation A

Figure 7B

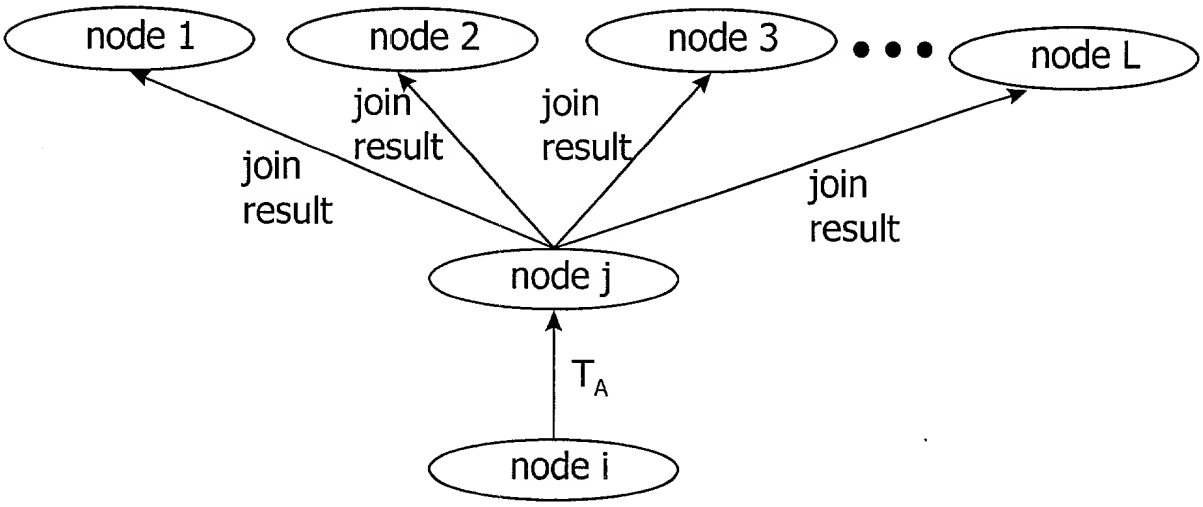


Figure 8

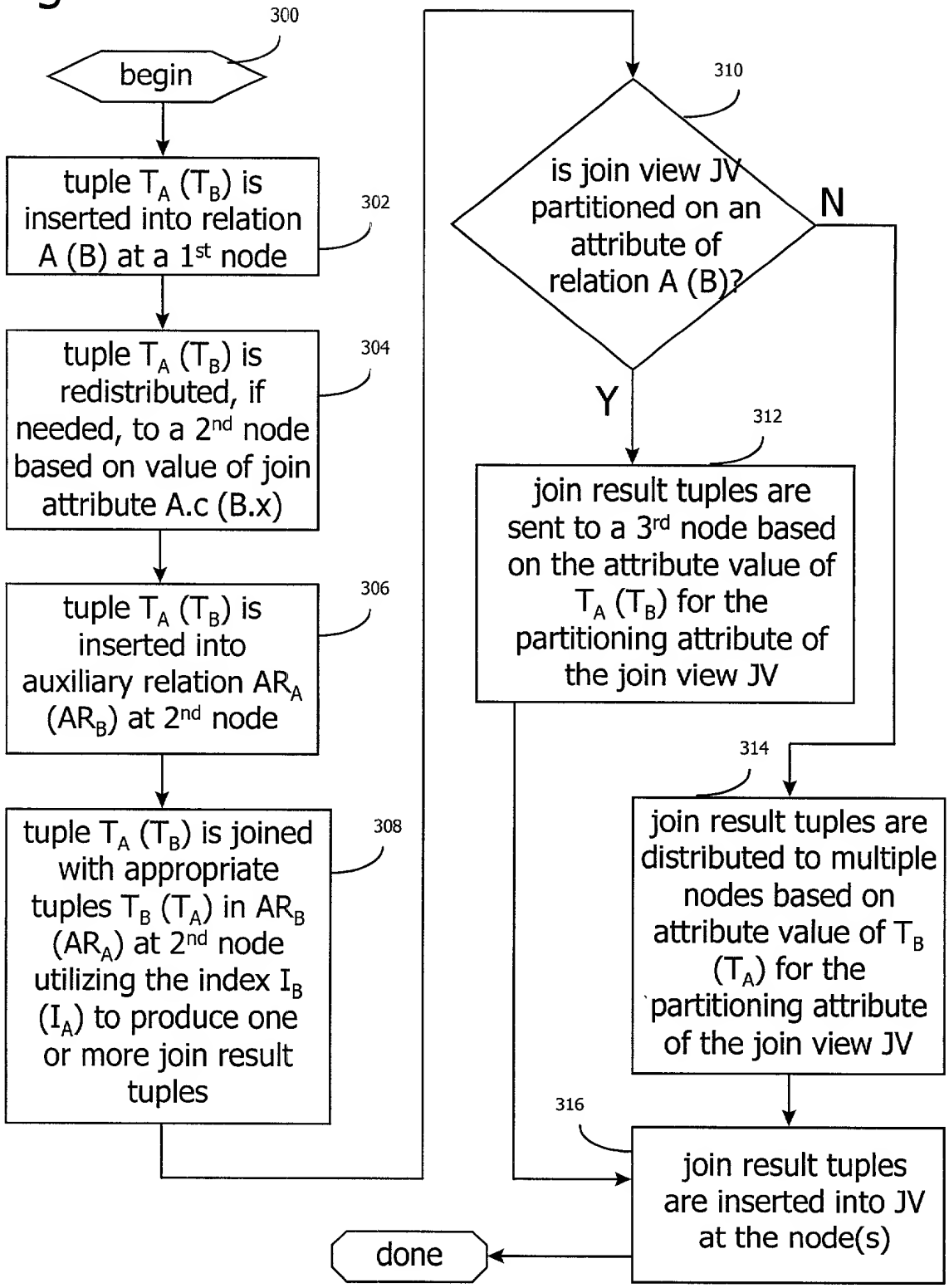

300
begin
tuple T_A (T_B) is inserted into relation A (B) at a 1st node
302
tuple T_A (T_B) is redistributed, if needed, to a 2nd node based on value of join attribute A.c (B.x)
304
tuple T_A (T_B) is inserted into auxiliary relation AR_A (AR_B) at 2nd node
306
tuple T_A (T_B) is joined with appropriate tuples T_B (T_A) in AR_B (AR_A) at 2nd node utilizing the index I_B (I_A) to produce one or more join result tuples
308
310
is join view JV partitioned on an attribute of relation A (B)?
N
Y
312
join result tuples are sent to a 3rd node based on the attribute value of T_A (T_B) for the partitioning attribute of the join view JV
314
join result tuples are distributed to multiple nodes based on attribute value of T_B (T_A) for the partitioning attribute of the join view JV
316
join result tuples are inserted into JV at the node(s)
done

Figure 9A

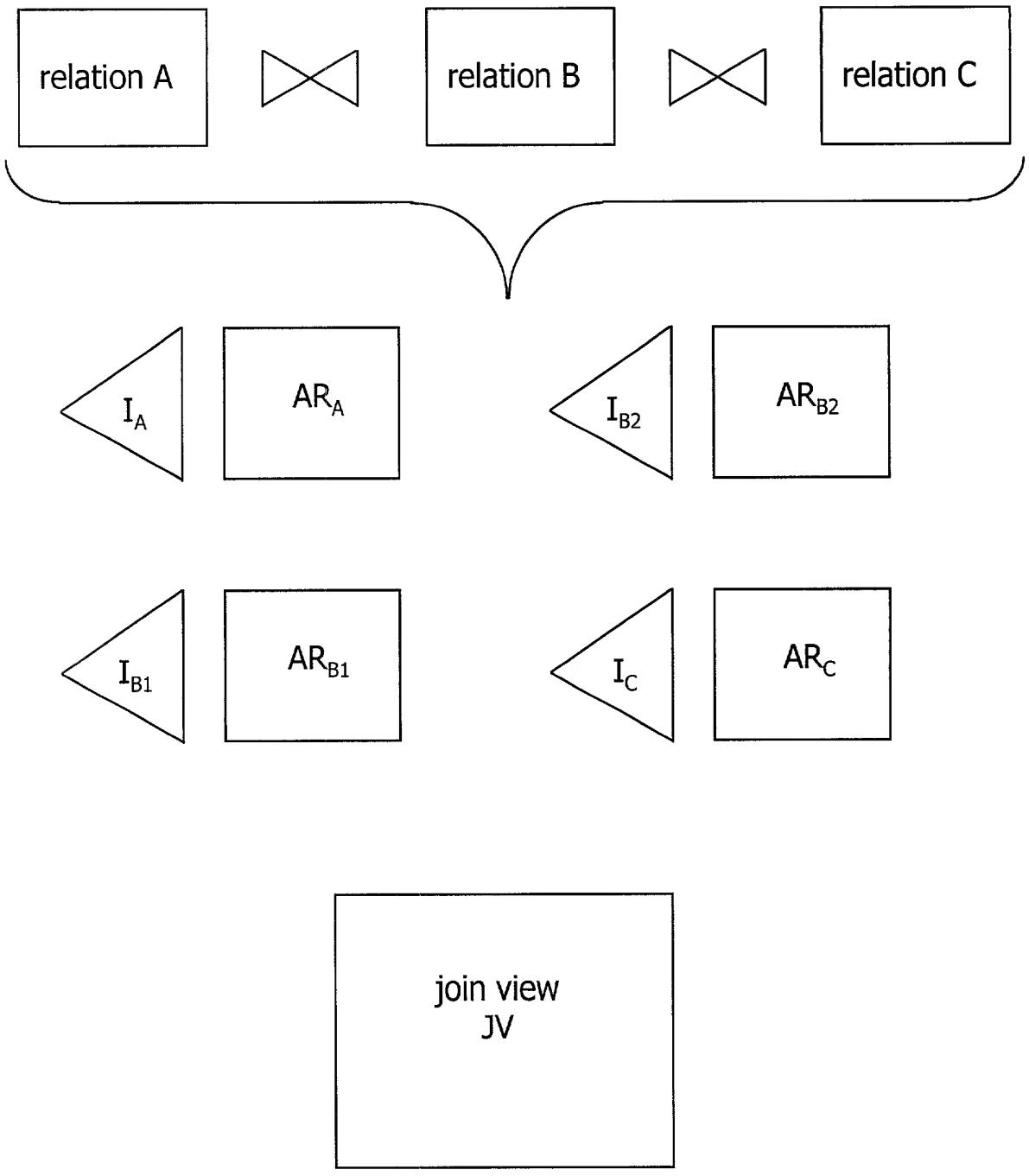

relation A
relation B
relation C
I_A
AR_A
I_{B2}
AR_{B2}
I_{B1}
AR_{B1}
I_C
AR_C
join view
JV

Figure 9B

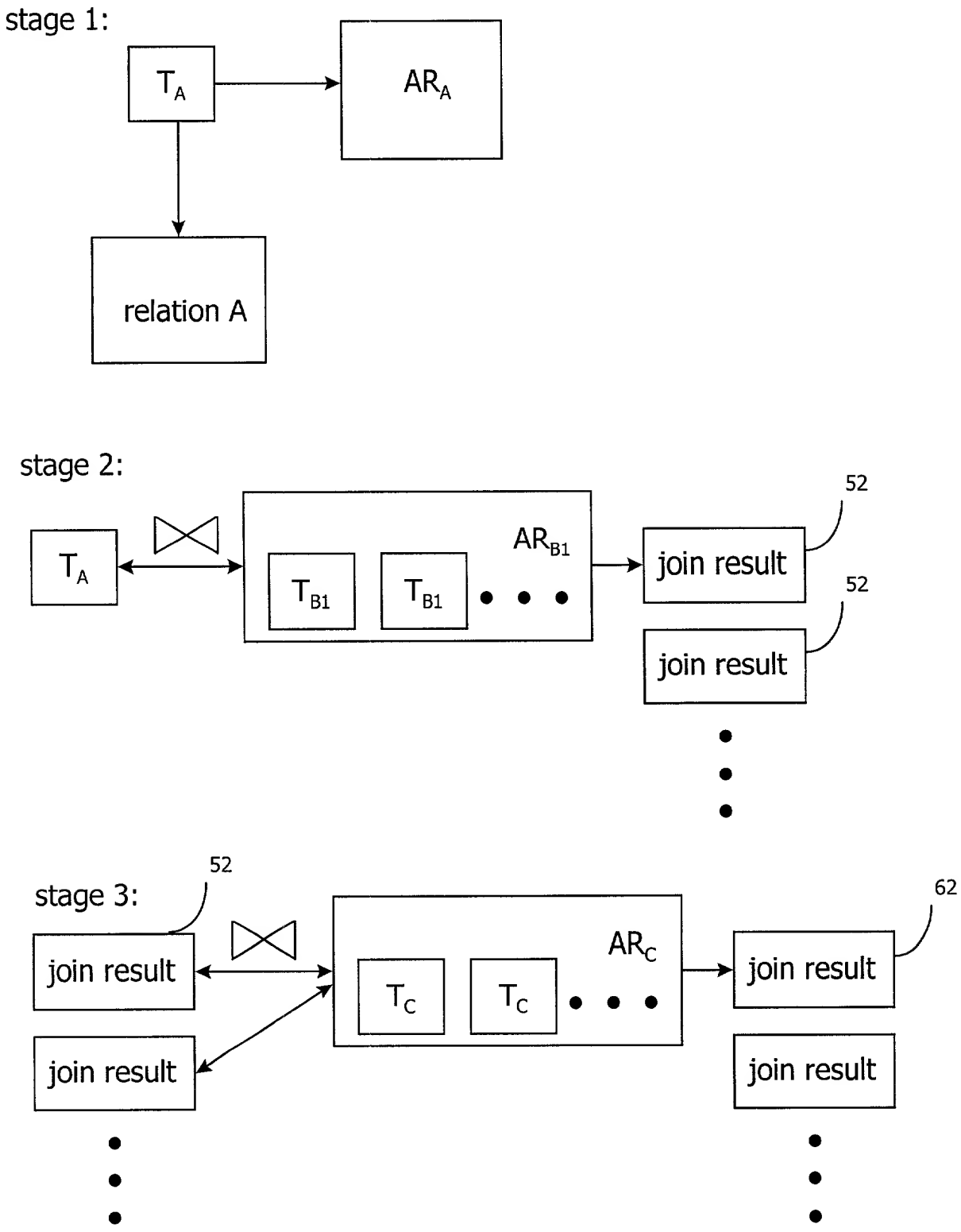

stage 1:
T_A
AR_A
relation A
stage 2:
T_A
AR_{B1}
T_{B1}
T_{B1}
join result
52
join result
52
stage 3:
52
join result
join result
AR_C
T_C
T_C
62
join result
join result

Figure 9C

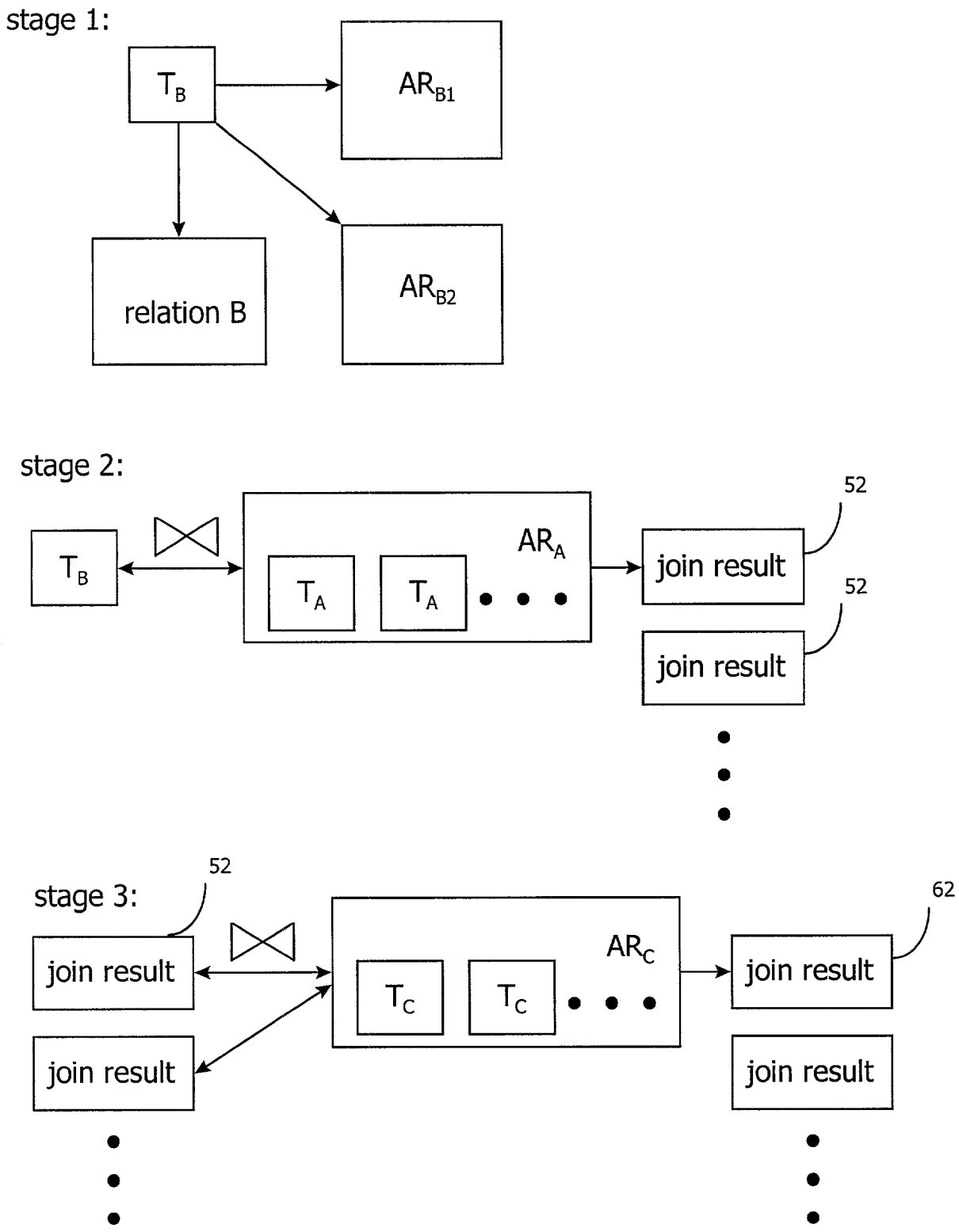

stage 1:
T_B
AR_{B1}
AR_{B2}
relation B
stage 2:
T_B
AR_A
T_A
T_A
52
join result
52
join result
stage 3:
52
join result
join result
AR_C
T_C
T_C
62
join result
join result

Figure 9D

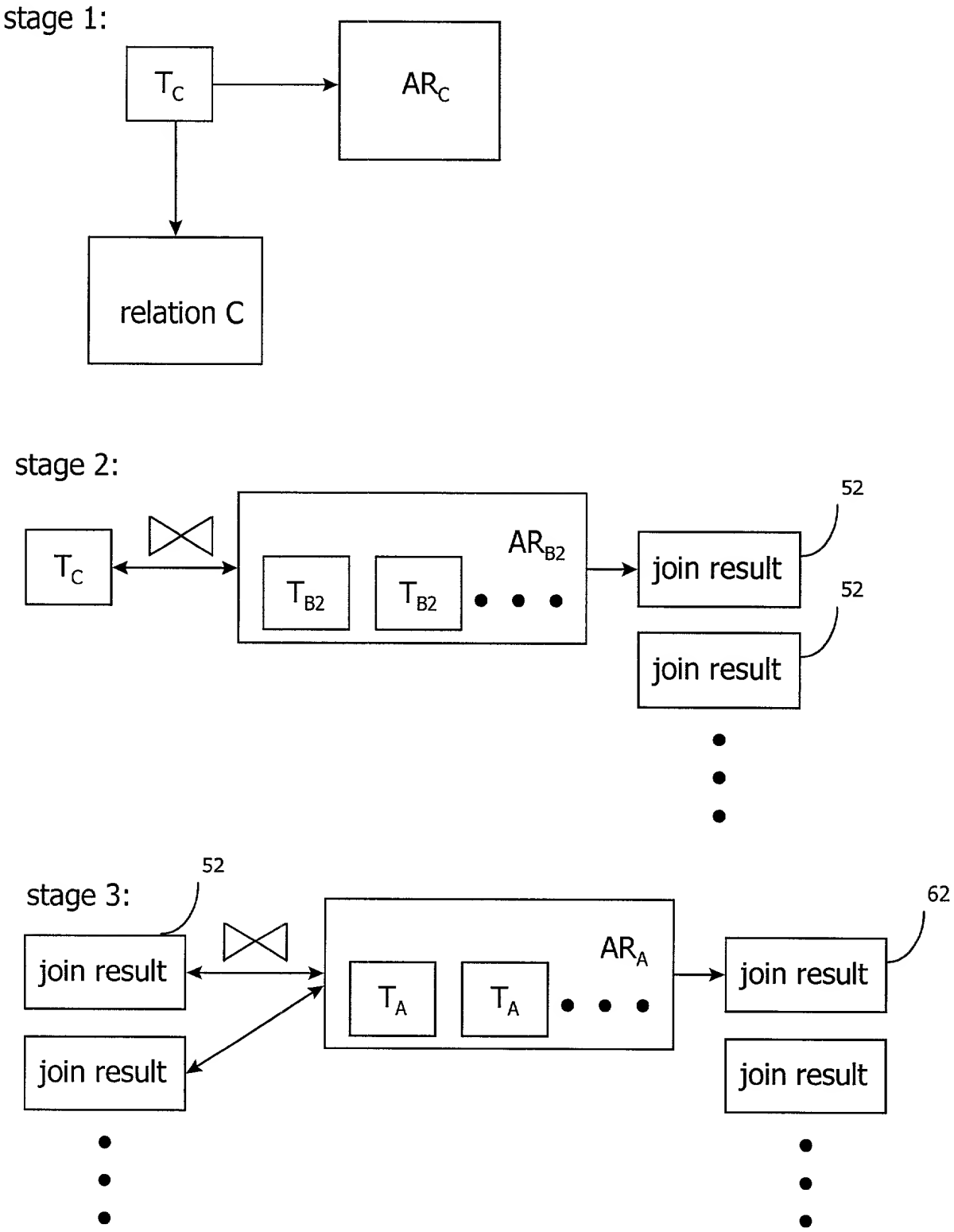
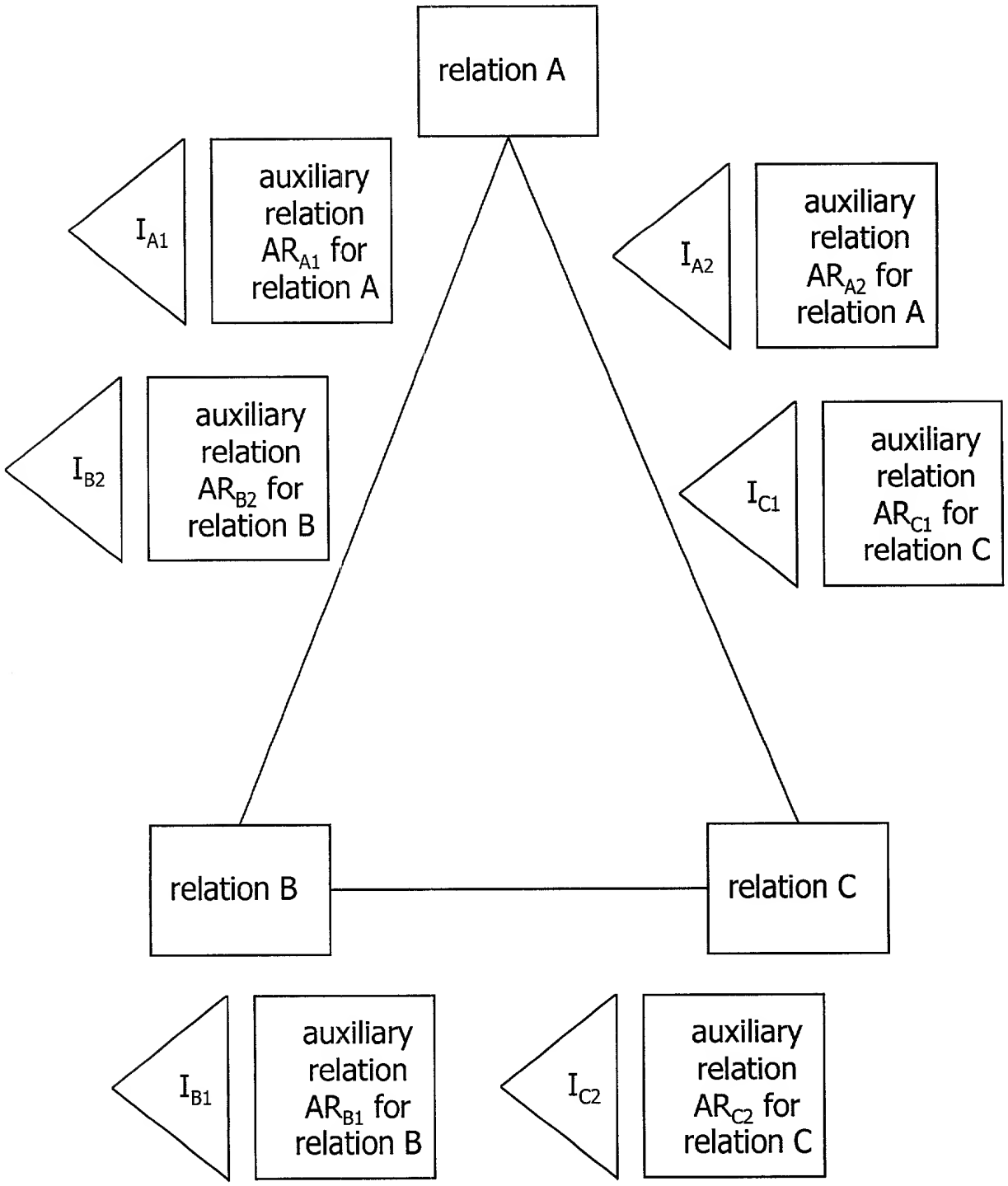

stage 1:
T_C
AR_C
relation C
stage 2:
T_C
AR_{B2}
T_{B2}
T_{B2}
52
join result
52
join result
stage 3:
52
join result
join result
AR_A
T_A
T_A
62
join result
join result

Figure 10



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